

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/983,056	10/23/2001	Kenji Ukai	04917.0095	8941

7590 11/05/2003

Finnegan, Henderson, Farabow
Garrett & Dunner, L.L.P.
1300 I Street, N.W.
Washington, DC 20005-3315

EXAMINER

DOVE, TRACY MAE

ART UNIT	PAPER NUMBER
----------	--------------

1745

DATE MAILED: 11/05/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/983,056

Applicant(s)

UKAI ET AL.

Examiner

Tracy Dove

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 14-18 is/are rejected.
- 7) ☒ Claim(s) 8-13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3,4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Art Unit: 1745

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The information disclosure statements (IDS) submitted on 1/23/02 and 2/14/02 have been considered by the examiner.

Specification

The disclosure is objected to because of the following informalities: on page 3, line 5 “electrode 8” should recite “electrode 36”.

Appropriate correction is required.

The disclosure is objected to because of the following informalities: on page 3, second to last line, “8YSZ” should recite “YSZ”, which refers to yttria-stabilized zirconia.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Badwal et al., US 5,942,349.

Art Unit: 1745

Badwal teaches a solid oxide fuel cell (col. 1, lines 7-10) comprising an electrolyte layer of 3 mol% yttria-zirconia (first solid electrolyte), a cathode (air electrode) and an anode (fuel electrode substrate) of nickel (first catalyst)-3 mol% yttria-zirconia cermet (second solid electrolyte). The electrolyte is sandwiched between the cathode and the anode (col. 9, lines 25-40 and Figure 1).

Thus the claims are anticipated.

The limitation regarding bending strength is inherent in the teaching of Badwal. Specifically, the nickel-3 mol% yttria-zirconia cermet inherently has a bending strength of 500 MPa or more because identical materials have identical properties (note claim 2 of the instant invention).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7 and 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Badding et al., US 6,428,920 in view of Badwal et al., US 5,942,349.

Badding teaches a solid oxide fuel cell comprising a positive air electrode, a negative fuel electrode, an electrolyte structure interposed between the positive air electrode and the negative fuel electrode, and a roughened interfacial layer (interlayer cermet film) interposed between the electrolyte structure and at least one of the electrodes (col. 5, lines 65-col. 6, lines 11). Fuel electrode materials include cermet materials with 1-40% inert phase such as nickel (first

Art Unit: 1745

catalyst)/yttria stabilized zirconia (second solid electrolyte) cermet and noble metal/yttria stabilized zirconia cermets (col. 6, lines 45-54). The electrolyte (first solid electrolyte) is preferably 3-6 mol% yttria-stabilized zirconia or 2-10 mol% scandia-stabilized zirconia because such electrolyte materials have higher mechanical strength (col. 7, lines 48-67). The interfacial layer is a polycrystalline ceramic of the same composition as the electrolyte (col. 4, lines 49-51) and an electronic conductive metal or cermet (second catalyst) (col. 5, lines 1-23).

Badding does not explicitly teach the fuel electrode has a bending strength of 500 MPa or more. Specifically, Badding is silent regarding the mole percent of yttria stabilizing the zirconia.

However, Badwal teaches a solid oxide fuel cell (col. 1, lines 7-10) comprising an electrolyte layer of 3 mol% yttria-zirconia (first solid electrolyte), a cathode (air electrode) and an anode (fuel electrode substrate) of nickel (first catalyst)-3 mol% yttria-zirconia cermet (second solid electrolyte). The electrolyte is sandwiched between the cathode and the anode (col. 9, lines 25-40 and Figure 1).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have been motivated to use the fuel electrode of nickel-3 mol% yttria/zirconia cermet of Badwal for the fuel electrode of Badding (nickel/yttria stabilized zirconia) in order to improve the mechanical strength of the fuel electrode during processing. Badding teaches the 3-6 mol% of yttria in zirconia is preferred because it has higher mechanical strength during processing (col. 7, lines 54-58). Furthermore, Badwal teaches fuel electrodes comprising a cermet of nickel-3 mol% yttria/zirconia are known in the art. One of skill would have been motivated to use the known fuel electrode of Badwal in

Art Unit: 1745

view of the teaching of Badding that the fuel electrode comprises nickel/yttria stabilized zirconia cermet.

Note the limitation regarding bending strength is inherent in the teaching of Badwal. Specifically, the nickel-3 mol% yttria-zirconia cermet inherently has a bending strength of 500 MPa or more because identical materials have identical properties (note claim 2 of the instant invention). Furthermore, the limitation regarding ion conductivity is inherently disclosed by Badding, which teaches an electrolyte of scandia-stabilized zirconia containing 2-10 mol% scandia (note claim 5 of the instant invention).

Allowable Subject Matter

Claims 8-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 8-13 are directed toward a solid oxide fuel cell having an electrolyte film, an air electrode and a fuel electrode wherein the fuel electrode comprises scandia-stabilized zirconia containing 3-6 mol% scandia and a first catalyst.

The prior art does not teach a solid oxide fuel cell comprising the fuel electrode of the instant claims. Badwal teaches a solid oxide fuel cell comprising an anode of nickel-3 mol% yttria-zirconia cermet (col. 9, lines 25-40). Badwal does not teach or suggest a solid oxide fuel cell having an anode of scandia-stabilized zirconia containing 3-6 mol% scandia. Badding teaches fuel electrode materials include cermet materials with 1-40% inert phase such as nickel/yttria stabilized zirconia cermet and noble metal/yttria stabilized zirconia cermet (col. 6,

Art Unit: 1745

lines 45-54). Badding does not teach or suggest a scandia-stabilized zirconia containing 3-6 mol% scandia.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ruka et al. 5,908,713 teaches a solid oxide fuel cell having an air electrode, an electrolyte and a layered fuel electrode. Both layers of the fuel electrode preferably comprise 8-12 mol% yttria-stabilized zirconia (col. 4, lines 62-67).

Lockhart et al. 5,261,944 teaches a nickel cermet of nickel and zirconia stabilized with yttria (5-20 mol%).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is (703) 308-8821. The Examiner may normally be reached Monday-Thursday (9:00 AM-7:30 PM). My supervisor is Pat Ryan, who can be reached at (703) 308-2383. The Art Unit receptionist can be reached at (703) 308-0661 and the official fax numbers are 703-872-9310 (after non-final) and 703-872-9311 (after final).



Tracy Dove
Patent Examiner
Technology Center 1700
Art Unit 1745

October 30, 2003